



AU9475718

(12) PATENT ABRIDGMENT (11) Document No. AU-B-75718/94
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 679558

(54) Title
A TAMPERPROOF CLOSURE FOR BOTTLES AND THE LIKE

International Patent Classification(s)

(51)⁵ B65D 047/06 B65D 025/42 B65D 047/12

(51)⁶ B65D 041/34

(22) Application Date : 11.10.94

(21) Application No. : 75718/94

(30) Priority Data

(31) Number (32) Date (33) Country
MI93A2327 03.11.93 IT ITALY

(43) Publication Date : 18.05.95

(44) Publication Date of Accepted Application : 03.07.97

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(56) Prior Art Documents
US 5246124
US 4458817
US 3817418

(57) Claim

1. A tamperproof closure for bottles and the like including a pouring body having a free edge, an outside threadway, and an annular outer flange; a tubular body having an annular ledge on its interior, elevations and depressions defining a grooved contour, and an annular folding tab; and a screw cap having an inside threadway mating with the outside threadway on the pouring body, said screw cap being attached to the tubular body through a line of weakness; a coupling between the tubular body and the pouring body making the pouring body angularly rigid with the tubular body.

4. A closure according to claim 3, wherein the front teeth projecting from the ledge are provided in a large number, preferably forty in number, and that the front teeth projecting from the flange are at least two in number located diametrically opposite from each other.

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**COMPLETE SPECIFICATION
(ORIGINAL)**

Application Number: Class **Int. Class**
Lodged:

Complete Specification Lodged:

Accepted:
Published:

Priority

Related Art:

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Invention Title:

A TAMPERPROOF CLOSURE FOR BOTTLES AND THE LIKE

Our Ref : 386385

POF Code: 7359/105969

The following statement is a full description of this invention, including the best method of performing it known to applicant(s):

DESCRIPTION

This invention relates to a tamperproof closure for bottles and the like.

Closures of the above type, while performing satisfactorily from several

5 aspects and being widely used, still may develop some problems on first
unsealing, as well as on the occasion of subsequent open/close cycles, when
their parts associated together along the axial direction to make up the closure
happen to have axial dimensions which lie close to extreme values of their
respective tolerance ranges. In particular, the screw cap may not screw off the
10 pouring body in a proper fashion because the latter fails to be held to the bottle
with adequate firmness.

The underlying problem of this invention is to provide a closure as
indicated which has such construction and performance features as to overcome
the above-mentioned drawback.

15 According to the invention there is provided a tamperproof closure for
bottles and the like including a pouring body having a free edge, an outside
threadway, and an annular outer flange; a tubular body having an annular ledge
on its interior, elevations and depressions defining a grooved contour, and an
annular folding tab; and a screw cap having an inside threadway mating with the
20 outside threadway on the pouring body, said screw cap being attached to the
tubular body through a line of weakness; a coupling between the tubular body
and the pouring body.

Further features and the advantages of a closure according to this
invention will be apparent from the following description of a preferred

According to the invention there is provided a tamperproof closure for bottles and the like including a pouring body having a free edge, an outside threadway, and an annular outer flange; a tubular body having an annular ledge on its interior, elevations and depressions defining a grooved contour, and an annular folding tab; and a screw cap having an inside threadway mating with the outside threadway on the pouring body, said screw cap being attached to the tubular body through a line of weakness; a coupling between the tubular body and the pouring body making the pouring body angularly rigid with the tubular body.

Further features and the advantages of a closure according to this invention will be apparent from the following description of a preferred



embodiment thereof, given by way of illustration and not of limitation with reference to the accompanying drawing figures, of which:

Figure 1 shows a part-sectional exploded view of a closure according to

the invention;

5 Figure 2 shows a detail of the closure in Figure 1, drawn to an enlarged scale;

Figure 3 shows another detail of the closure in Figure 1, also drawn to an enlarged scale; and

Figure 4 shows a general view, partly in section, of the closure in Figure 1
10 as applied to a bottle.

With reference to the drawing figures, generally shown at 1 is a tamperproof closure intended for use on a bottle 2 or the like, and having an axis X-X.

The bottle 2 includes a mouth opening 3 having a free edge 4 and being
15 formed with a groove 5



on its exterior, which groove defines an axial shoulder 6, and with a plurality of elevations 7 and depressions 8 jointly defining a grooved contour 9.

The closure 1 comprises a pouring body, generally indicated at 10, which has a free edge 11 and an outer annular flange 12. The pouring body 10, being preferably a polystyrene molding, is completed by a washer 13, made preferably of polyethylene, and encloses a one-way shutter 14, also made preferably of polyethylene, which functions to prevent unauthorized topping up of the bottle.

A multi-start outer threadway 15 is formed on the exterior of the pouring body 10 which has threads as indicated at 16, in this example two such threads.

The closure 1 further comprises a tubular body 17 having an upper end 18 provided with a tubular inner ledge 19, and a lower end 20.

An annular tab 21 is formed inwardly of the tubular body 17 which can be bent between a rest position wherein it is directed toward the lower end 20 of the tubular body, and a folded working position wherein it is facing the upper end 18.

The tubular body interior is formed, in its lower end 20 portion, with a plurality of elevations 22 and depressions 23 which jointly define a grooved

contour 24 matching the grooved contour 9.

It should be noted that the elevations 7 of the grooved contour 9 are rounded at the top, and that the elevations 22 of the grooved contour 24 are provided with respective axial extensions 25 having a width dimension "l" with a predetermined limited value, smaller than the individual width of the elevations 7.

The extensions 25 have rounded termination ends and lie axially through a predetermined length "L".

The closure 1 also comprises a cap 26 having a bottom 27 and a rim 28. The interior of the cap 26 is formed with a multi-start inside threadway 29 having threads 30. The number of the threads 30 is larger than that of the threads 16, preferably twice as large, i.e. four in the example shown.

The threads 16 and 30 have sawtooth-like profiles.

Axially compliant elastic means 31 are associated with the cap 26. These are embodied by a plurality of small jutting wings 32 from the bottom 27 of the cap toward the rim 28. The wings 32 are formed integrally with the cap and have a predetermined reach "s" along the axial direction.

The cap 26 is attached, around its rim 28, to

the upper end 18 of the tubular body 17 through a line of weakness 33 created by notches 34.

Thus, the cap 26 and tubular body 17 are a unitary construction to be obtained, of preference, by molding from a polyolefinic resin.

A face coupling 35 is formed between the tubular body 26 and the pouring body 10 to make the pouring body angularly rigid with the tubular body. The coupling 35 comprises front teeth 36 projecting from the ledge 19, and front teeth 37 projecting from the flange 12, said teeth being arranged to engage each other.

The teeth 36 are a large number, forty in the example shown, and are released from the mold cavity by opening the mold along the axial direction. There are at least two teeth 37 provided which locate diametrically opposite from each other; in the example shown, these teeth are two in number. They are released from the mold cavity by opening the mold radially along the direction of said diameter. The teeth 36 and 37 have all an isosceles triangular configuration with a limited apex angle A, where $A=60^\circ$ in the example shown, and a rounded apex, the rounding having a radius $r=0.2$ mm in the example.

A cap top 38, preferably of a polyolefinic

resin, covers the cap 26, snap-action engagement means 39 and a toothed coupling 40 being provided for securing the cap top onto the cap axially and angularly, respectively. An annular recess 41 is formed on the cap top 38 interior, so that an interspace 42 is defined between the cap top and the cap.

The closure 1 is assembled by fitting the cap top axially over the cap to cause the engagement means 39 to snap into the engaged position and the toothed coupling 40 to become engaged, followed by the fitting of the cap axially over the pouring body until the threads 30 and 15 snap over and past one another, thereby delivering an assembly which can be handled as a single unit. The snap-over movement of the threads is facilitated by that the cap is suitably allowed to expand by the interspace 42 provided. The configurations of the teeth 36 and 37 provides a lead-in for their mutual engagement.

The resultant closure, presently in a form adapted to be handled as a whole, is emplaced on the bottle mouth opening, again to an axial fit, using an appropriate pusher tool which is movable along the axis x-x and freely rotatable about the axis X-X.

Upon fitting the closure axially over the mouth opening, the extensions 25 will begin to engage

the grooved contour 9 of the bottle mouth, before the tab 21 engages with the edge 4. The extensions 25 are eased into the depressions 8 of the grooved contour 9 by their rounded ends meeting the rounded ends of the elevations 7. As the axial fitting movement continues, the tab, which had been folded over by means of some appropriate tool or by the passage of the pouring body, will engage the shoulder on the bottle mouth, thereby securing the closure on the bottle. In the meantime, the wings 32 will abut against the free edge 11 of the pouring body, with enough elastic yield in the axial direction as provided for by the pusher stroke, to ultimately become compressed as allowed by the tolerances for the various axial dimensions.

On completion of the fitting step, the face coupling makes the pouring body angularly rigid with the tubular body, and hence the bottle.

Upon first unsealing, by turning the cap top, and the cap with it, in the unscrew direction the line of weakness is first ruptured, causing the cap to separate from the tubular body and, accordingly, to screw out of the pouring body. During first unsealing, as well as on the occasion of each subsequent screwing off/on of the cap, the pouring body will be held angularly to the tubular body, and hence the bottle, by

the coupling provided, even if the axial dimensions were all at extreme values of their tolerance ranges.

A major advantage of the tamperproof closure of this invention comes from its unfailing performance on the occasion of the cap unsealing and each subsequent screwing off/on cycle.

A further advantage is that the closure of this invention is constructed of easily made parts, which can be readily assembled and installed on a bottle.

Understandably, a person of skill in the art may, in order to fill contingent and specific demands, make many changes and modifications unto the closure described in the foregoing without departing from the protection scope of the invention as defined in the following claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A tamperproof closure for bottles and the like including a pouring body having a free edge, an outside threadway, and an annular outer flange; a tubular body having an annular ledge on its interior, elevations and depressions defining a grooved contour, and an annular folding tab; and a screw cap having an inside threadway mating with the outside threadway on the pouring body, said screw cap being attached to the tubular body through a line of weakness; a coupling between the tubular body and the pouring body making the pouring body angularly rigid with the tubular body.
2. A closure according to claim 1, wherein the coupling includes teeth projecting from the ledge and teeth projecting from the flange.
3. A closure according to claim 2, wherein the teeth are front teeth.
4. A closure according to claim 3, wherein the front teeth projecting from the ledge are provided in a large number, preferably forty in number, and that the front teeth projecting from the flange are at least two in number located diametrically opposite from each other.
5. A closure according to any one of claims 2 to 4, wherein the teeth have an isosceles triangular configuration with rounded apex
6. A closure according to any one of the preceding claims, wherein the outside threadway on the pouring body and the inside threadway on the cap have sawtooth profile threads.
7. A closure according to any one of the preceding claims, wherein the outside threadway and the inside threadway are multi-start threadways, and that

the inside threadway has a larger number of threads than the outside threadway, preferably twice as many.

8. A closure according to any one of the preceding claims further including elastic means interposed between the cap and the pouring body.

5 9. A closure according to claim 7, wherein said elastic means are small wings projecting from the cap and formed integrally with the cap.

10. A closure according to any one of the preceding claims, wherein the elevations of the grooved contour on the tubular body include axial extensions having a width dimension of predetermined limited value and rounded ends of predetermined length to start engaging in depressions of a grooved contour formed on the bottle while upon fitting the closure axially onto the bottle, the tab is yet to engage the bottle.

11. A closure according to any one of the preceding claims, further including a cap top to cover the cap, said cap top being formed with an annular recess, 15 thereby defining an interspace between the cap top and the cap.

12. A tamperproof closure for bottles substantially as hereinbefore described and illustrated.

20 DATED: 20 December, 1996

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ABSTRACT

A tamperproof closure (1) for bottles and the like, affording unfailing performance on the occasions of first unsealing and subsequent open/close cycles, and having a construction which facilitates its assembly into a whole adapted to be handled as a unit, and once assembled, its installation onto the bottle, comprises a pouring body (10) provided with a flange (12), a tubular body (17) provided with an annular inner ledge (19), a screw cap (26) attached to the tubular body (17) through a line of weakness (33), and a face coupling (35) between the ledge (19) on the tubular body (17) and the flange (12) on the pouring body (10) for making the pouring body (10) angularly rigid with the tubular body (17).

(Fig. 4)

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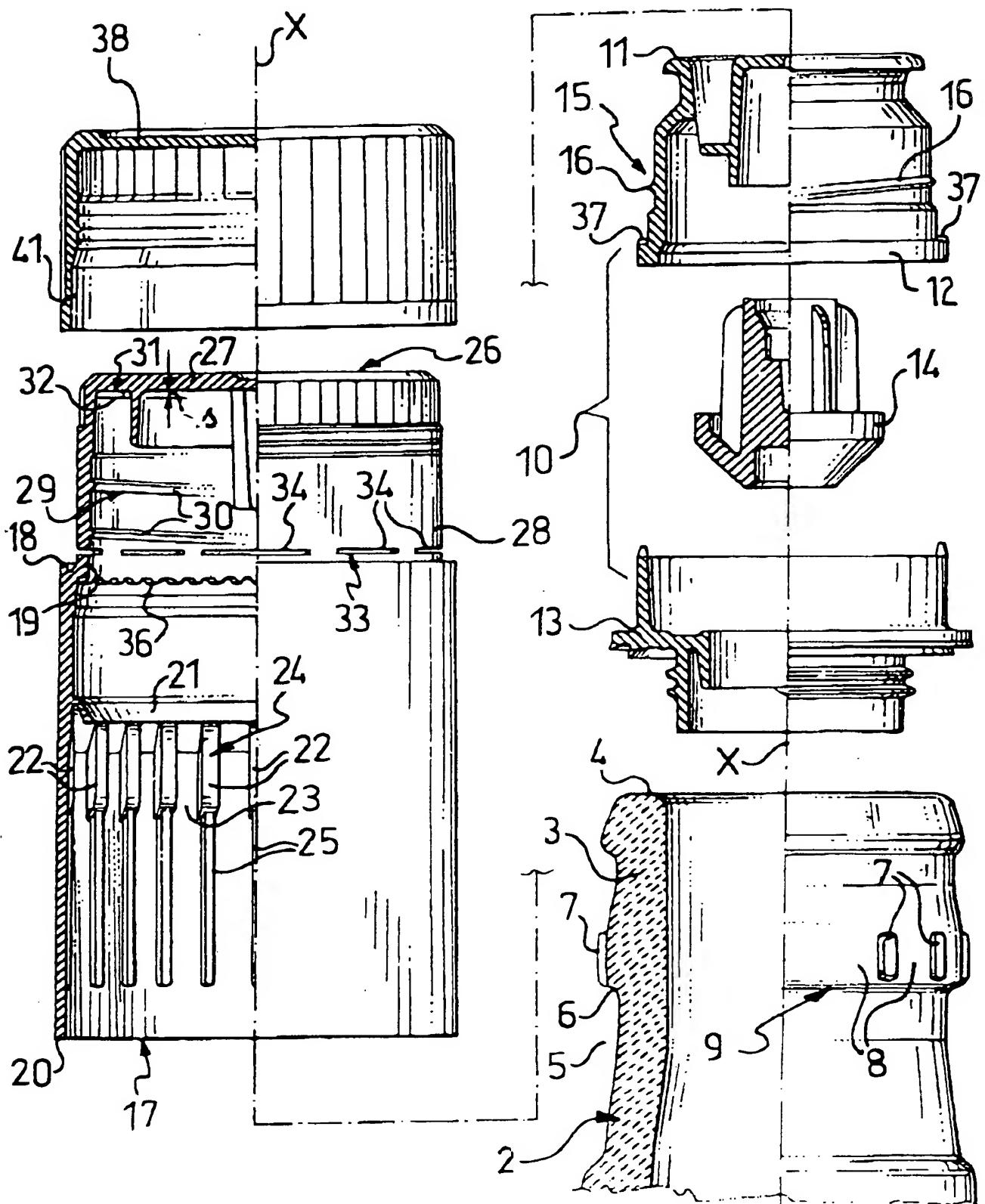


FIG.1

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FIG.2

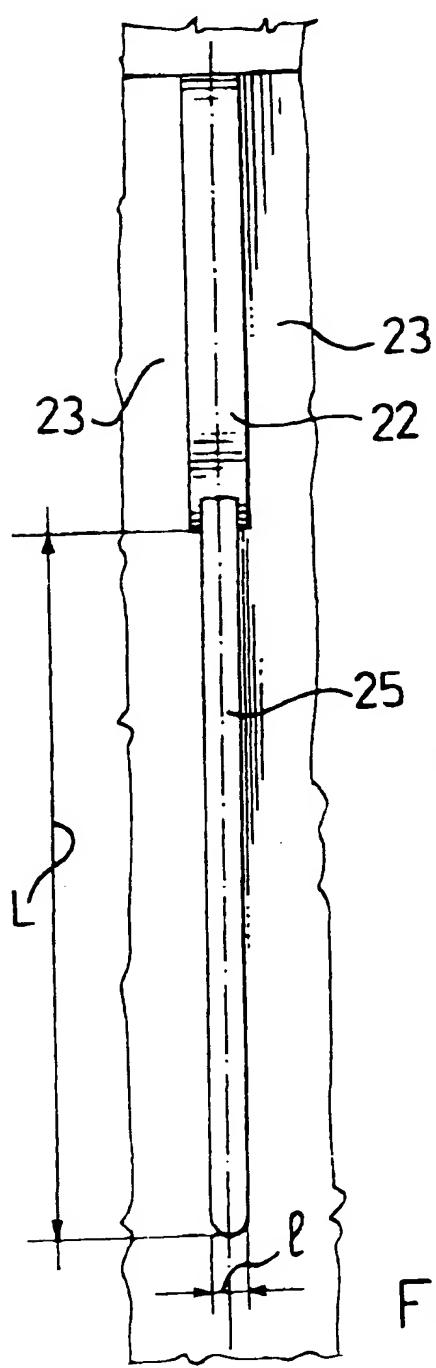
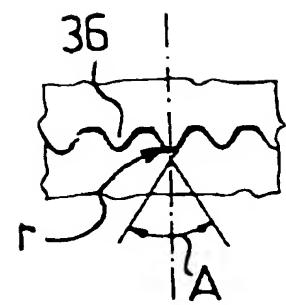


FIG.3

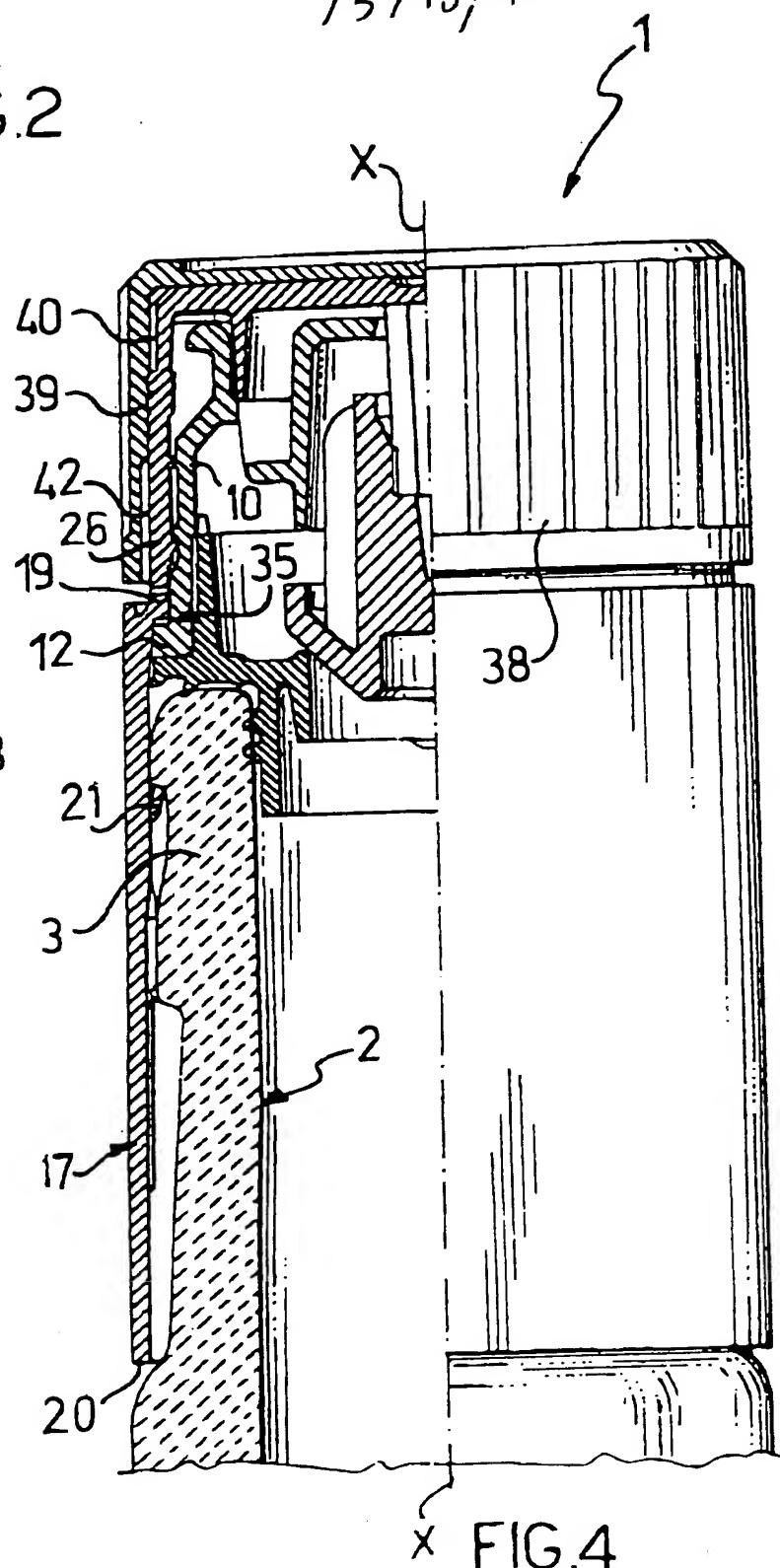


FIG.4

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